SEQ ID NO:40; BoPAG9v has the sequence of SEQ ID NO:42; BoPAG 15 has the sequence of SEQ ID NO:44; BoPAG 16 has the sequence of SEQ ID NO:46; BoPAG 17 has the sequence of SEQ ID NO:48; BoPAG 18 has the sequence of SEQ ID NO:50; BoPAG 19 has the sequence of SEQ ID NO:52; BoPAG 20 has the sequence of SEQ ID NO:54 or BoPAG 21 has the sequence of SEQ ID NO:56 with a monoclonal antibody preparation.

REMARKS

I. Status of the Claims

Claims 1-14 and 30-34 are pending in the application and stand rejected under 35 U.S.C. §112, second paragraph, 35 U.S.C. §102(b) and 35 U.S.C. §103. The specific grounds for rejection, and applicants' response thereto, are set out in detail below.

II. Formalities

Applicants note the drawing defects. Applicants will provide formal drawings with corrected margins and font size upon the receipt of a Notice of Allowance.

III. Rejections Under §112, Second Paragraph

A. Claims 2, 10 and 11

Claims 2, 10 and 11 are rejected as vague for the use of acronyms. Applicants traverse. The term "PAG" is, in fact, defined in its first instance in claim 1. While "BoPAG" should be clear in light of the definition of PAG, an additional definition is provided in claims 10 and 11. Applicants do not believe that insertion of SEQ ID NOs into claims 10 and 11 is necessary. A

dependent claim corresponding to each of claims 10 and 11 has been provided. Reconsideration and withdrawal of the rejection is respectfully requested.

B. Claim 9

Claim 9 is rejected for use of the term "immunologic detection." Applicants traverse, but in the interest of advancing the prosecution, the claim has been canceled. Reconsideration and withdrawal of the rejection is respectfully requested.

C. Claims 10 and 11

Claims 10 and 11 recited "polyclonal antisera" and "monoclonal antibody preparation" respectively. The examiner argues the claims are unclear. Applicants traverse. These two terms are so frequently used and well known in the field that their meaning is beyond question. The issue of what is included ("materials made from/involved in antibody production") is not understood. Polyclonal antisera comprises polyclonal antibodies, and monoclonal antibody preparations comprise monoclonal antibodies. Inclusion of other substances is neither implied nor excluded. Reconsideration and withdrawal of the rejection is respectfully requested.

D. Claims 1-14 and 30-34

Claims 1-14 and 30-34 are rejected as lacking essential steps. Applicants traverse, but in the interest of advancing the prosecution, the claims have been amended to recite a contacting step, a detecting step and a correlation step, as suggested by the examiner. Reconsideration and withdrawal of the rejection is respectfully requested.

IV. Rejections Under 35 U.S.C. §102(b)

A. Roberts et al. (1995)

Claims 1, 3, 5, 6, 9 and 14 are rejected under §102 as anticipated by Roberts *et al.* (1995). The examiner characterizes the reference as teaching evaluation of maternal serum concentrations for PAGs, and correlating measurement to pregnancy in cattle and sheep. Applicants respectfully traverse.

It is readily acknowledged that the prior art discloses the detection of BoPAG1 in the context of diagnosing pregnancy. However, the entire point of the present invention is that this assay, like others in the prior art, are deficient because they fail to recognize PAGs that are unique to ***early*** pregnancy, or that such PAGs even exist. As such, these assays cannot be used for at least three months post-partum because of the persistence of the antigen, and thus have limited use in agricultural breeding programs.

In contrast, the present inventors have identified a class of PAGs that, in addition to be abundant early in pregnancy, also are absent in significant amounts post-partum and have minimal cross-reactivity with late PAGs that persist post-partum. These PAGs provide for a substantially improved assay that can be used immediately post-partum without concern for costly "false-positive" results. As such, the claims are drawn to a particular ***class*** of PAGS that are "present in early pregnancy and absent at about two months post-partum."

The selection of particular PAGs that satisfy these criteria is an affirmative element of every claim. Therefore, the absence of this element from the prior art – and it clearly is absent – means that an anticipation rejection will not stand. Reconsideration and withdrawal of the rejection is, therefore, respectfully requested.

B. Zoli et al. (1992)

Claims 1, 3, 5, 6, 9 and 13 are rejected under §102 as anticipated by Zoli *et al.* (1992). The reference is cited as disclosing a double-antibody RIA for BoPAGs, and measuring BoPAG levels during pregnancy in cows. Applicants respectfully traverse.

Again, applicants acknowledge that the prior art discloses the detection of various PAGs in the context of diagnosing pregnancy. These assays are deficient, however, for the reasons given above. In contrast, the present inventors have identified a class of PAGs that permit a better assay in that it can be used immediately post-partum without concern for costly "false-positive" results.

As with the preceding rejection, the selection of particular PAGs that satisfy these criteria is an affirmative element of every claim. Therefore, the absence of this element from the prior art means that an anticipation rejection will not stand. Reconsideration and withdrawal of the rejection is, again, respectfully requested.

V. Rejections Under 35 U.S.C. §103

A. Claims 4, 7 and 8

Claims 4, 7 and 8 are rejected as obvious over Roberts *et al.* (1995) or Zoli *et al.* (1992) in view of Sasser *et al.* (1989). Roberts and Zoli are cited as above; Sasser is cited as teaching use of saliva, milk or urine as samples to PAG. Applicants traverse the rejection.

Irrespective of what Sasser may or may not disclose regarding PAGs, it clearly does not address the material element of "at least one pregnancy associated antigen $(PAG)_2$ wherein said PAG is present in early pregnancy and absent at about two months post-partum." Moreover, Sasser, just like Roberts and Zoli, provides no indication that such PAGs even exist. Therefore,

it is pure hindsight to argue that any of these references can suggest, with sufficient motivation or the requisite likelihood success, the invention now claimed.

Thus, in light of the foregoing, applicants respectfully request reconsideration and withdrawal of the rejection.

B. Claims 2 and 10-12

Claims 2 and 10-12 are rejected as obvious over Roberts *et al.* (1995) or Zoli *et al.* (1992) in view of Xie *et al.* (1997). Roberts and Zoli are cited as above; Xie is cited as disclosing particular PAGs. Applicants traverse the rejection.

Xie *et al.* (1997) is not prior art against the instant claims. The present invention claims priority to provisional applications filed on March 20, 1998, and October 28, 1998. Both of these applications were filed less than one year prior to the Xie *et al.* (PNAS 1997) paper, which was published in November of 1997. The non-inventor authors on that paper – Bixby, Szafranska, DeMartini and Hecht – did not contribute to the conception of the subject matter disclosed in the Xie *et al.* paper, and thus it is not "by another" as defined under §102(a). See attached declaration of Dr. R. Michael Roberts.

Thus, in light of the foregoing, applicants respectfully request reconsideration and withdrawal of the rejection.

C. Claims 30-34

Claims 30-34 are rejected over Roberts *et al.* (1995), Zoli *et al.* (1992), Xie *et al.* (1997) and Gerrie *et al.* (1986). Roberts, Zoli and Xie are cited as above.[1] Gerrie is cited as teaching an ELISA for PAG. Applicants traverse the rejection.

First, applicants point out that the human pregnancy-associated α2-glycoprotein is completely unrelated to the PAGs being discussed here, which are found only in Artiodactyls. Thus, to the extent that the examiner is attempting to extrapolate more from Gerrie than an ELISA based-assay for diagnosing pregnancy, applicants submit that such is not merited. In fact, it should be pointed out that a variety of different assay formats may be employed according to the present invention, including but not limited to ELISA, RIA, Western blot, dot-blot and lateral flow technology.

More to the point, and irrespective of what Gerrie may or may not disclose regarding human PAGs, it clearly does not address the material element of "at least one pregnancy associated antigen $(PAG)_2$ wherein said PAG is present in early pregnancy and absent at about two months post-partum." Moreover, Gerrie, just like Roberts, Zoli and Xie, provides no indication that such PAGs even exist. Therefore, remains pure hindsight to argue that any of these references can suggest, with sufficient motivation or the requisite likelihood success, the invention now claimed.

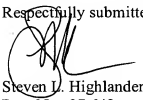
Thus, in light of the foregoing, applicants respectfully request reconsideration and withdrawal of the rejection.

[1] It should be noted that Xie *et al.* reference described in previous rejections is from a different journal.

VI. Conclusion

In light of the foregoing, applicants respectfully submit that all claims are in condition for allowance, and an early notification to that effect is earnestly solicited. Should Examiner Cook have any questions regarding this response, a telephone call to the undersigned in invited.

Respectfully submitted,



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MARKED UP COPY OF CLAIMS

1. (Amended) A method for detecting pregnancy in a bovine animal comprising:

(a) obtaining a sample from said animal; and

(b) [detecting] contacting said sample with an antibody that binds immunologically to at least one pregnancy associated antigen (PAG), wherein said PAG is present in early pregnancy and absent at about two months post-partum; and

(c) detecting said PAG bound to said antibody;

whereby the presence of [the] said PAG in said sample indicates that said animal is pregnant.

9. (Canceled) The method of claim 1, wherein said detecting comprises immunologic detection.

10. (Amended) The method of claim [9] 1, wherein said [immunologic] detection comprises detection of [BoPAG2] bovine PAG (BoPAG) 2, BoPAG4, BoPAG5, BoPAG6, BoPAG7, BoPAG9, [b]BoPAG 7v; [b]BoPAG9v; [b]BoPAG 15; [b]BoPAG 16; [b]BoPAG 17; [b]BoPAG 18; [b]BoPAG 19; [b]BoPAG 20 or [b]BoPAG 21 with polyclonal antisera.

11. (Amended) The method of claim [9] 1, wherein said [immunologic] detection comprises detection of [BoPAG2] bovine PAG (BoPAG) 2, BoPAG4, BoPAG5, BoPAG6, BoPAG7, BoPAG9, [b]BoPAG 7v; [b]BoPAG9v; [b]BoPAG 15; [b]BoPAG 16; [b]BoPAG 17; [b]BoPAG 18; [b]BoPAG 19; [b]BoPAG 20 or [b]BoPAG 21 with a monoclonal antibody preparation.

12. (Amended) The method of claim 9, wherein said [immunologic] detection comprises ELISA.

13. (Amended) The method of claim 9, wherein said [immunologic] detection comprises RIA.

14. (Amended) The method of claim 9, wherein said [immunologic] detection comprises Western blot.

182. (New) The method of claim 10, wherein BoPAG 2 has the sequence of SEQ ID NO:25, BoPAG4 has the sequence of SEQ ID NO:27, BoPAG5 has the sequence of SEQ ID NO:28, BoPAG6 has the sequence of SEQ ID NO:29, BoPAG7 has the sequence of SEQ ID NO:30, BoPAG9 has the sequence of SEQ ID NO:32, BoPAG 7v has the sequence of SEQ ID NO:40; BoPAG9v has the sequence of SEQ ID NO:42; BoPAG 15 has the sequence of SEQ ID NO:44; BoPAG 16 has the sequence of SEQ ID NO:46; BoPAG 17 has the sequence of SEQ ID NO:48; BoPAG 18 has the sequence of SEQ ID NO:50; BoPAG 19 has the sequence of SEQ ID NO:52; BoPAG 20 has the sequence of SEQ ID NO:54 or BoPAG 21 has the sequence of SEQ ID NO:56 with polyclonal antisera.

183. (New) The method of claim 1, wherein BoPAG2 has the sequence of SEQ ID NO:25, BoPAG4 has the sequence of SEQ ID NO:27, BoPAG5 has the sequence of SEQ ID NO:28, BoPAG6 has the sequence of SEQ ID NO:29, BoPAG7 has the sequence of SEQ ID NO:30, BoPAG9 has the sequence of SEQ ID NO:32, BoPAG 7v has the sequence of SEQ ID NO:40; BoPAG9v has the sequence of SEQ ID NO:42; BoPAG 15 has the sequence of SEQ ID NO:44; BoPAG 16 has the sequence of SEQ ID NO:46; BoPAG 17 has the sequence of SEQ ID NO:48; BoPAG 18 has the sequence of SEQ ID NO:50; BoPAG 19 has the sequence of SEQ ID NO:52; BoPAG 20 has the sequence of SEQ ID NO:54 or BoPAG 21 has the sequence of SEQ ID NO:56 with a monoclonal antibody preparation.